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EXAMINER	
WANG, TED M	

ART UNIT	PAPER NUMBER
2611	

DATE MAILED: 06/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/026,662	HASSON, JAIME	
	Examiner	Art Unit	
	Ted M. Wang	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The indicated allowability of claims 1-24 are withdrawn in view of the newly discovered reference(s) to Peric et al. (Design of signal constellations for Gaussian channel by using iterative polar quantization, Electrotechnical Conference, 1998. MELECON 98, 9th Mediterranean, Volume 2, 18-20 May 1998 Page(s):866 - 869 vol.2 Digital Object Identifier 10.1109/MELCON.1998.699349). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al. (US 6,754,287) in view of Peric et al. (Design of signal constellations for Gaussian channel by using iterative polar quantization, Electrotechnical Conference, 1998. MELECON 98., 9th Mediterranean, Volume 2, 18-20 May 1998 Page(s):866 - 869 vol.2 Digital Object Identifier 10.1109/MELCON. 1998.699349).

- With regard claims 1 and 20, Underbrink et al. discloses a portable communication device comprising:

  a sigma-delta N-phase shift keying modulator (Fig.10 element 1000, column 9 lines 11-23, where N =2, 4, ...) with an analog to digital converter or a quantizer (Fig. 12 element 1234 and column 11 lines 45-50).

  Underbrink et al. discloses all of the subject matter as described in the above paragraph except for specifically teaching the quantizer (analog to digital converter) is a non-uniform polar quantizer.

  However, Peric et al. teaches a non-uniform polar quantizer (Fig.4 and 5, section II, lines 1-10).

  It is desirable to have a non-uniform polar quantizer. The reason for this is that the non-uniform quantizer minimizes the mean-square error (mse) with respect to the error probability and gain (page 869, section IV, lines 1-15) so that the digital communication performance can be improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement the non-uniform polar quantizer as taught by Peric et al. into Underbrinks' sigma-delta N-phase shift keying modulator to replace the quantizer as taught by Underbrink et al. so as to improve digital communication performance.

  In addition, the sigma-delta N-phase shift keying modulator with the non-uniform polar quantizer as taught by Underbrink et al. and Peric et al. inherently can be used to produce the claim limitation "to produce, based on an integrated

signal, a quantized output representing a symbol selected from a set of N symbols, the selected symbol corresponding to a cell of a set of N non-uniform cells covering a complex plane in a non-overlapping manner, wherein said cell corresponds to a phase of said integrated signal." as recited in lines 3-6. The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971);< In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

- With regard claim 2, Underbrink et al. further discloses wherein said N is selected from a group including: 2, 4, 8, 16, and 32 (column 7 line 41 – column 8 line 8).

4. Claims 3, 4, 15, 16-19, 21 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al. (US 6,754,287) in view of Steensgaard-Madsen (US 6,271,782) and Peric et al. (Design of signal constellations for Gaussian channel by using iterative polar quantization, Electrotechnical Conference, 1998. MELECON 98., 9th Mediterranean, Volume 2, 18-20 May 1998 Page(s):866 - 869 vol.2 Digital Object Identifier 10.1109/MELCON.1998.699349).

- With regard claims 3 and 21, Underbrink et al. discloses a portable communication device comprising:

a sigma-delta N-phase shift keying modulator (Fig.10 element 1000, column 9 lines 11-23, where N =2, 4, ...) with an analog to digital converter or a quantizer (Fig. 12 element 1234 and column 11 lines 45-50).

Underbrink et al. discloses all of the subject matter as described in the above paragraph except for specifically teaching (a) the quantizer (analog to digital converter) is a non-uniform polar quantizer; (b) an adder able to subtract said quantized output signal from said baseband input signal to produce a different signal; (c) an integrator able to integrate said difference output signal to produce an integrated signal.

Steensgaard-Madsen teaches (a) a sigma-delta modulator having a non-uniform quantizer (Fig.24 element 228, Fig.27, and column 21 lines 48-67).

It is desirable to have a sigma-delta modulator having a non-uniform polar quantizer. The reason for this is that, in general, the dynamic-range performance is generally more important than the peak-signal-to-noise ratio performance. A non-uniform loop quantizer can be used to improve the dynamic-range performance. The loop quantizer's step size should be small in the midrange, such that the quantization-noise performance is good for small input signals. The step size is increased near the boundaries of the resolving range, such that the modulator will remain stable if large input signals should leak through to the loop quantizer. Using this technique, the loop quantizer can be simplified greatly without deteriorating the overall performance noticeably, and/or the modulator's stability be enhanced (column 21 lines 48-67). Therefore, It would have been

obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus/method as taught by Steensgaard-Madsen in which having a sigma-delta modulator having a non-uniform quantizer, into Underbrinks' Sigma-Delta modulator circuitry so as to improve dynamic-range performance so that the modulator's stability is enhanced.

Steensgaard-Madsen further teaches (b) an adder (Fig.24 element 228 input adder) able to subtract said quantized output signal (Fig.24 element 230 output) from said baseband input signal (Fig.24 element g(t)) to produce a different signal (Fig.24 element adder output) to improve dynamic-range performance in order to improve the delta-sigma modulator performance.

Steensgaard-Madsen further teaches (c) an integrator (Fig.24 element $H_C(s)$ and Fig.25 elements 252 and 254) able to integrate said difference output signal (Fig.24 element adder output, Fig.25 element 252 to produce an integrated signal (column 19 lines 15-50) in order to average the error signal (difference signal) so that the delta-sigma modulator performance is improved.

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by Steensgaard-Madsen in which having a non-uniform quantizer comprising an adder able to subtract said quantized output signal from said baseband input signal to produce a different signal; and an integrator able to integrate said difference output signal to produce an integrated signal, into Underbrinks' Sigma-

Delta modulator circuitry so as to improve dynamic-range performance so that the modulator's stability is enhanced.

Underbrink et al. and Steensgaard-Madsen disclose all of the subject matter as described in the above paragraph except for specifically teaching the non-uniform quantizer (analog to digital converter) is a non-uniform polar quantizer.

However, Peric et al. teaches a non-uniform polar quantizer (Fig.4 and 5, section II, lines 1-10).

It is desirable to have a non-uniform polar quantizer. The reason for this is that the non-uniform quantizer minimizes the mean-square error (mse) with respect to the error probability and gain (page 869, section IV, lines 1-15) so that the digital communication performance can be improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement the non-uniform polar quantizer as taught by Peric et al. into Underbrink et al. and Steensgaard-Madsens' sigma-delta N-phase shift keying modulator to replace the quantizer as taught by Underbrink et al. and Steensgaard-Madsen so as to improve digital communication performance.

In addition, the sigma-delta N-phase shift keying modulator with the non-uniform polar quantizer as taught by Underbrink et al. and Steensgaard-Madsen and Peric et al. inherently can be used to produce the claim limitation "to produce said quantized output so that it represents a symbol selected from a set of N symbols according to which of a set of N non-uniform cells the phase of said

integrated signal belongs, said N non-uniform cells covering a complex plane in a non-overlapping manner." as recited in lines 8-12. The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971);< In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

- With regard claim 4, Underbrink et al. further discloses wherein said N is selected from a group including: 2, 4, 8, 16, and 32 (column 7 line 41 – column 8 line 8).
- With regard claim 15, which is a mobile phone claim related to claim 3, Underbrink et al. and Steensgaard-Madsen and Peric et al. disclose all of the subject matter as described in the above paragraph except for specifically teaching producing said quantized output by selecting a symbol from a set of N symbols according to which of a set of N non-uniform cells the phase of said integrated signal belongs, said N non-uniform cells covering a complex plane in a non-overlapping manner.

However, Peric et al. further teaches producing said quantized output by selecting a symbol from a set of N symbols according to which of a set of N non-uniform cells (Fig.4 and page 868 section III) the phase of said integrated signal belongs (Fig.1, page 867 equation 4.d, and page 868 right column – page 869

left column line 4), said N non-uniform cells covering a complex plane in a non-overlapping manner (Fig.4).

The reason for this is that the non-uniform quantizer minimizes the mean-square error (mse) with respect to the error probability and gain (page 869, section IV, lines 1-15) so that the digital communication performance can be improved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement the non-uniform polar quantizer as taught by Peric et al. into Underbrink et al. and Steensgaard-Madsens' sigma-delta N-phase shift keying modulator to replace the quantizer as taught by Underbrink et al. and Steensgaard-Madsen so as to improve digital communication performance.

All other limitation is contained in claim 3. The explanation of all the limitation is already addressed in the above paragraph.

- With regard claim 16, Underbrink et al. and Steensgaard-Madsen and Peric et al. disclose all of the subject matter as described in the above paragraph except for specifically teaching wherein said baseband input signal is analog and further comprising: converting said quantized output signal from digital to analog prior to subtracting said quantized output signal from said baseband input signal.

However, Steensgaard-Madsen further teaches wherein said baseband input signal is analog (column 15 lines 44-58) and further comprising: converting said quantized output signal from digital to analog prior to subtracting said quantized output signal from said baseband input signal (Fig.24 element 228) so

as to improve dynamic-range performance so that the modulator's stability is enhanced.

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to implement the method as taught by Steensgaard-Madsens into Underbrink et al. and Steensgaard-Madsens' and Peric' sigma-delta N-phase shift keying modulator so as to improve dynamic-range performance so that the modulator's stability is enhanced.

- With regard claim 17, Underbrink et al. further discloses wherein said N is selected from a group including: 2, 4, 8, 16, and 32 (column 7 line 41 – column 8 line 8).
- With regard claim 18, Underbrink et al. further discloses using said quantized output signal to select one of N carrier signals each having a frequency and a different one of N phases, thus producing a constant envelope signal at said frequency having variable phase (Fig.10 and column 9 line 59 – column 10 line 4); and amplifying, filtering and transmitting said constant envelope signal (Fig.9 element 904).
- With regard claim 19, Underbrink et al. further discloses wherein said frequency is a radio frequency (column 5 lines 43-51). Refer to Fig.9. Since the power amplifier 904 is a radio amplifier, it indicates that the modulator 902 output is a radio frequency signal. In further, since the modulator input is a baseband signal as described in claim 16, it is inherent that the reference signal generator generates radio frequency.

- With regard claim 24, Underbrink et al. further discloses set of N non-uniform cells in accordance with a phase transition corresponding to said set of N symbols (Fig.10 timing diagram and column 9 line 24 – column 10 line 4).

5. Claims 5, 9, 10, 14, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al. (US 6,754,287) and Peric et al. (Design of signal constellations for Gaussian channel by using iterative polar quantization, Electrotechnical Conference, 1998. MELECON 98., 9th Mediterranean, Volume 2, 18-20 May 1998 Page(s):866 - 869 vol.2 Digital Object Identifier 10.1109/MELCON. 1998.699349) as applied to claim 1 above, and further in view of Dent et al. (US 6,181,920).

- With regard claims 5 and 22, Underbrink et al. further discloses an antenna (Fig.2 element 211).

  Underbrink et al. and Peric et al. discloses all of the subject matter as described in the above paragraph except for specifically teaching the antenna is a dipole antenna.

  However, Dent et al. teaches a dipole antenna (column 4 lines 3-12). It is desirable to have a dipole antenna in the transmitter. The reason for this is that the dipole antenna is simply a two-wire transmission line so the size of the antenna could be very small, and the size reduction will allow the antenna to be hidden in the radio package for many applications so that the cost reduction can be achieved. Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by

Dent et al. in which having a dipole antenna in the transmitter, into Underbrink et al. and Peric' transmitter in order to reduce the size of the antenna so that the transmitter cost can be reduced.

- With regard claim 9, which is a device claim related to claims 2 and 5, all limitation is contained in claims 2 and 5. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claims 10 and 23, which is a mobile phone claim related to claim 5, all limitation is contained in claim 5. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 14, which is a mobile phone claim related to claims 9 and 10, all limitation is contained in claims 9 and 10. The explanation of all the limitation is already addressed in the above paragraph.

6. Claims 6, 7, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al. (US 6,754,287) and Peric et al. (Design of signal constellations for Gaussian channel by using iterative polar quantization, Electrotechnical Conference, 1998. MELECON 98., 9th Mediterranean, Volume 2, 18-20 May 1998 Page(s):866 - 869 vol.2 Digital Object Identifier 10.1109/MELCON. 1998.699349) and Dent et al. (US 6,181,920) as applied to claim 5 above, and further in view of McCune (US 6,636,112).

- With regard claims 6 and 7, Underbrink et al. further discloses a Power Amplifier (Fig.2 element 209).

Underbrink et al. and Peric et al. and Dent et al. disclose all of the subject matter as described in the above paragraph except for specifically teaching the power amplifier is a switching power amplifier/Class-E amplifier.

However, McCune teaches a switching power amplifier/Class-E amplifier (column 2 lines 8-36) in order to reduce the power amplifier switching loss so that the power amplifier power efficient is improved.

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus as taught by McCune in which having a switching power amplifier/Class-E amplifier, into Underbrink et al. and Peric et al. and Dents' modified transmitter so as to reduce the power amplifier switching loss so that the power amplifier power efficient is improved.

- With regard claim 11, which is a mobile phone claim related to claim 6, all limitation is contained in claim 6. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 12, which is a mobile phone claim related to claim 7, all limitation is contained in claim 7. The explanation of all the limitation is already addressed in the above paragraph.

7. Claims 8 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Underbrink et al. (US 6,754,287) and Peric et al. (Design of signal constellations for Gaussian channel by using iterative polar quantization, Electrotechnical Conference, 1998. MELECON 98., 9th Mediterranean, Volume 2, 18-20 May 1998 Page(s):866 - 869

vol.2 Digital Object Identifier 10.1109/MELCON.1998.699349) and Dent et al. (US 6,181,920) and McCune (US 6,636,112) as applied to claim 6 above, and further in view of Oursler (US 4,063,199).

- With regard claim 8, Underbrink et al. and Peric et al. and Dent et al. and McCune disclose all of the subject matter as described in the above paragraph except for specifically teaching a bandpass filter coupled to output of said switching amplifier and coupled to said dipole antenna.

  However, Oursler teaches that a bandpass filter coupled to output of said switching amplifier and coupled to an antenna (Fig.1 element 30 and column 4 line 51 – column 5 line 8).

  It is desirable to have a bandpass filter coupled to output of said switching amplifier and coupled to an antenna. The reason for this is that network 30 provides the proper bandpass filter of the rectangular waveform so as to remove the unwanted modulation products and the undesirable higher frequency harmonics of the carrier frequency so that the transmission signal quality is improved (column 4 line 64 – column 5 line 8). Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the apparatus/method as taught by Oursler in which having a bandpass filter coupled to output of said switching amplifier and coupled to said dipole antenna, into Underbrink et al. and Peric et al. and Dent et al. and McCunes' modified transmitter system so as to remove the unwanted modulation products

and the undesirable higher frequency harmonics of the carrier frequency so that the transmission signal quality is improved.

- With regard claim 13, which is a mobile phone claim related to claim 8, all limitation is contained in claim 8. The explanation of all the limitation is already addressed in the above paragraph.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M Wang
Examiner
Art Unit 2634

Ted M. Wang

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER